Notice of Allowability	Application No.	Applicant(s)
	09/397,814	HU, ZHONG-CHENG
	Examiner	Art Unit
	Daniel S. Metzmaier	1712

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment of 11/24/2003 & interview of 2/9/2004*.

2. ☒ The allowed claim(s) is/are *2,3,5,6,8-10,12,16-19,34,35,38,39,41-44,47,48,50 and 51*.

3. ☐ The drawings filed on _____ are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☒ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☒ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☒ to Paper No./Mail Date *11-8-00*.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

EXAMINER'S AMENDMENT

Interview Summary

1. Examiner called applicants' representative to discussed proposed amendment to further distinguish the claims. The discussion included the breadth of the species set forth in claim 7 and the exclusion of the titanium salt species alone. Applicants authorized the following examiner's amendment.

Examiner's amendment

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Elena S. Polovnikova, PhD on February 9, 2004.

The application has been amended as follows:

Replace the abstract as follows:

Methods for sol-gel processing that generally involve mixing together an inorganic metal salt, water, and a water miscible alcohol or other organic solvent, ~~preferably~~ at room temperature~~. A~~ with a macromolecular dispersant material, such as hydroxypropyl cellulose (HPC)~~, may optionally be~~ added. The resulting homogenous solution is incubated at a desired temperature and time to result in a desired product. ~~Several parameters of the method can be manipulated, making the method highly tunable and enabling production of sols and gels with various desired characteristics. For example, variables that can be tightly controlled and which control the product characteristics include the metal salt concentration (C), ratio of organic solvent to water (RH), temperature of incubation (T), time of incubation (t), and concentration of macromolecular dispersant (such as HPC).~~ The methods enable production of high quality sols and gels at lower temperatures than standard methods. The methods enable production of nanosize sols from inorganic metal salts. The methods offer sol-gel processing from inorganic metal salts.

Replace all claims with the following claims.

1 . (Cancelled).

2. (Previously Presented) The method of claim 19, wherein the step of preparing the solution comprises:

providing an aqueous solution of an inorganic metal salt;

providing an organic solvent; and,

mixing the inorganic metal salt solution and the organic solvent in proportions so that a desired metal salt concentration and a desired ratio of organic solvent to water are achieved.

3. (Previously Presented) The method of claim 19 further comprising the step of neutralizing the solution after the incubation.

4. (Cancelled).

5. (Currently Amended) The method of claim 19, wherein the dispersant is added prior to the incubation.

6. (Currently Amended) The method of claim 19, wherein the dispersant is added after the incubation.

7. (Cancelled).

8. (Previously Presented) The method of claim 19. wherein the organic solvent is selected from the group consisting of methanol, ethanol, isopropanol, n-propanol, tert-butyl alcohol, n-butanol, acetone and glycerol.

9. (Previously Presented) The method of claim 19, wherein the concentration of inorganic metal salt ranges from about 0.005 M to about 0.5 M.

10. (Original) The method of claim 9, wherein the concentration of inorganic metal salt ranges from about 0.025 M to about 0.2 M.

11. (Cancelled).

12 (Previously Presented) The method of claim 19, wherein the ratio of organic solvent to water ranges from about 1/1 to about 5/1.

13-15. (Cancelled).

16. (Previously Presented) The method of claim 19, wherein a sol is produced.

17. (Previously Presented) The method of claim 19, wherein the ratio of organic solvent to water ranges from about 1/1 to about 2/1 and a gel is produced.

18. (Previously Presented) The method of claim 19, wherein monodispersed particles are produced.

19. (Currently Amended) A method of sol-gel processing using an inorganic metal salt and a mixed solvent system, comprising:

preparing a solution including an inorganic metal salt, water, and an organic solvent having a metal salt concentration and a volume ratio of organic solvent to water, wherein the inorganic metal salt contains a metal selected from the group consisting of aluminum, hafnium, silicon, zirconium, lanthanum, germanium, tantalum, combinations thereof, and combinations thereof with titanium;

adding a dispersant to the solution; and

incubating the solution at a temperature from about 20 °C to about 25 °C for a period of time;

wherein the metal salt concentration, volume ratio of organic solvent to water, temperature, and time are selected to provide a sol or a gel having desired characteristics;

wherein the sol or the gel is capable of forming a coating;

wherein the volume ratio of organic solvent to water ranges from about 1/1 to 10/1;

wherein nanosized particles are produced; and,

wherein the time ranges from about one minute to about 72 hours.

20-33. (Cancelled).

34. (Currently Amended) A method of producing a sol from an inorganic metal salt at room temperature comprising:

preparing a solution including an inorganic metal salt, water, and an organic solvent having a metal salt concentration and a volume ratio of organic solvent to water, wherein the inorganic metal salt contains a metal selected from the group consisting of aluminum, hafnium, silicon, zirconium, lanthanum, germanium, tantalum, combinations thereof, and combinations thereof with titanium;

adding a dispersant to the solution; and,

incubating the solution at room temperature for a period of time;

wherein the metal salt concentration, volume ratio of organic solvent to water, and time are selected to provide a sol having desired characteristics;

wherein the sol is capable of forming a coating;

wherein the volume ratio of organic solvent to water ranges from about 1/1 to about 10/1;

wherein the sol contains nanosized particles; and,

wherein the time ranges from about one minute to about 72 hours.

35. (Original) The method of claim 34, further comprising the step of neutralizing the solution after the incubation.

36. (Cancelled).

37. (Cancelled).

38. (Original) The method of claim 34, wherein the organic solvent is selected from the group consisting of methanol, ethanol, isopropanol, n-propanol, tert-butyl alcohol, n-butanol, acetone, and glycerol.

39. (Currently Amended) The method of claim 34, wherein the concentration of inorganic metal salt ranges from about 0.005 M to about 0.5 M.

40. (Cancelled).

41. (Original) The method of claim 34, wherein the temperature ranges from about 20 °C to about 25 °C.

42. (Original) The method of claim 34, further comprising drying the sol to produce a particle powder.

43. (Currently Amended) A method of producing monodispersed particles at room temperature, comprising:

preparing a solution including an inorganic metal salts, water, and an organic solvent having a metal salt concentration and a volume ratio of organic solvent to water,

wherein the inorganic metal salt contains a metal selected from the group consisting of aluminum, hafnium, silicon, zirconium, lanthanum, germanium, tantalum, combinations thereof, and combinations thereof with titanium;

adding a dispersant to the solution; and,

incubating the solution at room temperament for a period of time;

wherein the metal salt concentration, volume ratio of organic solvent to water, and time are selected to provide a sol having desired characteristics;

wherein the sol is capable of forming a coating;

wherein drying the sol to produce a powder of monodisperse particles; and

wherein the volume ratio of organic solvent to water ranges from about 1/1 to about 10/1; and,

wherein the time ranges from about one minute to about 72 hours.

44. (Original) The method of claim 43, further comprising the step of neutralizing the solution after the incubation.

45. (Cancelled).

46. (Cancelled).

47. (Original) The method of claim 43, wherein the organic solvent is selected from the group consisting of methanol, ethanol, isopropanol, n-propanol, tert-butyl alcohol, n-butanol, acetone, and glycerol.

48. (Original) The method of claim 43, wherein the concentration of inorganic metal salt ranges from about 0.005 M to about 0.5 M.

49. (Cancelled).

50. (Previously Presented) The method of claim 43, wherein the volume ratio of organic solvent to water ranges from about 5/1 to about 10/1.

51. (Original) The method of claim 43, wherein the temperature ranges from about 20 °C to about 25 °C,

52-59. (Canceled).

Reasons for allowance

3. The following is an examiner's statement of reasons for allowance: the prior art does not disclose or fairly suggest methods as claimed employing the combination of claimed steps and parameters. More particularly, the prior art does not disclose the making sols as claimed at room temperature or at a temperature of about 20 °C to about 25 °C.

Basis for the amendment to the independent claims is found in claims 7, 37 and 46 and the disclosed species of titanium salts alone or in combination with the other salts.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel S. Metzmaier whose telephone number is (703) 308-0451. The examiner can normally be reached on 9:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (571) 272-1119. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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